

ATTACHMENT A

Remarks

Claims 1, and 5-44 are pending in the present application with claims 1, 5-29, 37 and 41-44 withdrawn from consideration. By this amendment, Applicants have amended claims 30, 32, 35 and 36 and cancelled claim 31. Applicants respectfully submit the present application is in condition for allowance based on the discussion which follows.

Claims 32-34 were rejected under 35 U.S.C. § 112, second paragraph. With regard to claim 32, it was alleged that the (b) at least one type of ethylenic fluoromonomer units copolymerizable with the unit (a) and containing no sulfonic acid functional groups is the same as segment B of claim 30 and thus, indefinite as not being clear as to where, in the polymer, one block begins and ends.

In order to more clearly recite Applicants invention, Applicant has amended claim 30 to include the subject matter of claim 31. Thus, claim 30 (currently amended) now recites the fluoropolymer chain segment B has a crystalline melting point or glass transition point of 100° C or higher. In accordance with specification page 9 lines 18-25, the claimed melting point results from a segment B of a sufficiently long length. Consequently, segment B is distinguishable from unit (b) and thus segment B is distinguishable from segment A, in that segment B will be significantly longer than unit (b) to provide the claimed melting point whereas unit (b) which is a unit copolymerized with unit (a), will be short in length and thus not have the claimed melting point of 100° C or higher which segment B has.

Moreover, it should be noted that the fluoropolymer chain segment B is capable of contributing to the improvement of the mechanical properties of the claimed material (see specification page 7, lines 13-18 whereas unit (b) cannot provide improvements in mechanical strength due to its short chain length. For improving mechanical strength of the fluoropolymer, it is preferable that the fluoropolymer chain segment B is a crystalline polymer chain or an amorphous polymer chain having a high glass transition point. Specifically stated, the multi-segmented fluoropolymer preferably has a fluoropolymer chain (segment B) having a crystalline melting point or glass transition point of 100° C or higher (specification page 9, lines 18-25).

Based on the foregoing, it is clear where, in the polymer, one block begins and ends and therefore, Applicants respectfully submit that claim 32 is not indefinite.

With regard to claim 33, it was alleged that when $n=0$, of the oxygen component, $(O)_n$ of the polymer, it is not clear how the atoms are bound to one another. Applicants respectfully submit that when n is equal to zero, oxygen is absent from the polymer and a bond joins the $CX_2=CX^1$ to the $-Rf-SO_2Y$ as would be readily apparent to one of ordinary skill in the art. Therefore, claim 33 is not indefinite.

Claims 30-36 and 38-41 were rejected under U.S.C. § 102(b) as being anticipated by Cisar. This rejection is respectfully traversed for reasons as stated below.

The claimed “multi-segmented fluoropolymer” of the present invention will be understood by one of ordinary skill in the art to be a fluoropolymer comprised of discrete segments in the form either blocks or grafts or a combination thereof (see, e.g., present specification page 11, lines 4-20; U.S. Patent No. 6,699,941 (hereinafter “the ‘941 patent”); and U.S. Patent No. 6,552,131 (hereinafter “the ‘131 patent”)). The IUPAC accepted definition of a “block copolymer” is a copolymer that is a block polymer where adjacent blocks are constitutionally different, i.e., each of these blocks comprises constitutional units derived from different characteristic species of monomer or with different composition or sequence distribution of constitutional units. The term “block” is a portion of a macromolecule, comprising many constitutional units that has at least one feature which is not present in the adjacent portions.

Further, one of ordinary skill in the art would understand that each block or segment is of a significant size relative to the individual constitutional units, i.e., monomers. For example, typical blocks or segments forming a block copolymer will be around 1,000 to 1.2 million in molecular weight as is disclosed in the ‘941 patent where segments A, A’ are between 3,000 and 60,000 and segment B is between 30,000 and 300,000; and the present specification, page 23, lines 1-10 where segment A has a molecular weight of 5,000 to 1 million, segment B, 1,000 to 1.2 million, segment C, 1,000 to 1 million and segment D, 1,000 to 1.2 million.

Cisar fails to teach or suggest a multi-segmented fluoropolymer that comprises a block copolymer. Cisar, in sharp contrast to the claimed block

copolymer discloses a random or polymer blend, for example column 7, lines 17-29 discloses the following:

“The composite membranes fabricated by the methods of the invention may comprise randomly blended polymers as well as alternating blocks, each block comprising essentially one particular polymer. For example, a composite membrane may be fabricated by forming, within each molecule, regions of pure PTFE and regions of low equivalent weight copolymer. The pure PTFE regions may crystallize to form a reinforcing matrix, while the low equivalent weight regions may furnish high proton conductivity paths. The methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane.”

The disclosed “block” of Cisar does not mean a block of a block copolymer, but means each polymer of a composite membrane comprising blended polymers.

Further, column 6, lines 58-64 of Cisar discloses that a composite membrane may be fabricated by melting a precursor to an ion conducting polymer with an inert polymer providing structural strength, such as PTFE. Thus, composite membrane is composed of polymer blend, not a block copolymer.

Nowhere does Cisar teach or suggest the claimed invention block copolymer. Cisar merely discloses Nafion, which is a random copolymer. Therefore, the present invention directed to a multi-segmented fluoropolymer is novel over and not obvious from Cisar.

Based on the foregoing, the claimed block of copolymer is not disclosed by or made obvious from Cisar. Therefore Applicants respectfully request that the rejection of the claims under 35 U.S.C. § 102(b) be withdrawn.

In view of the foregoing, Applicants respectfully submit the present application is in condition for allowance.

END REMARKS